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29 May 1961

SURVEY OF SOVIET HEAVY INDUSTRY (17)

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SURVEY OF SOVIET HEAVY INDUSTRY (17)

This is a series report, published approximately biweekly, which contains items of interest on Soviet heavy industry as reflected in articles, short news items, announements, etc., appearing in various USSR and other publications. The items contained in this report fall under the broad categories listed below in the table of contents.

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METALLURGY AND MINING

Steel-Pouring Crane

At the Novo-Kramatorsk Machinery Plant the technical design of the largest foundry crane has been completed. It is designed for pouring steel in open-hearth shops, where metal is smelted in increased-capacity furnaces. The height of the crane is more than 21 meters and its weight -- 710 tons. (Ekonomicheskaya Gazeta, 4 February 1961. Full translation)

Blowers

The Ashkhabad Petroleum Equipment Plant is organizing the production of VG-70 blowers for blast furnaces. (Turkmenskaya Iskra, 2 February 1961)

Metallurgical Machinery

The Moscow Experimental Plant of the All-union Scientific Research Institute of Metallurgical Machine Building is currently engaged in developing various machines for the rolling of gears, the making of extra-thin tubes, and for the drawing of wire. It is now assembling the "80", a three-roll machine. (Vechernyaya Moskva, 16 February 1961)

Drawing Mill

V. Zhukov, the director of the Moscow Experimental Plant of the VNII of Metallurgical Machine Building, has stated that due to lack of finishing components the 5-6/550 high-speed drawing mill had not been completed in time. The new 13/250 semi-automatic drawing mill has also been unfinished, because the Yaroslavl' Electrical Machinery Plant failed to deliver the needed electric motors. (Ekonomicheskaya Gazeta, 16 February 1961)

CHEMICAL INDUSTRY

Compressor Delay

In 1960 the Penza Compressor Plant failed to deliver compressors made for the Gorlovka Nitrogen Fertilizer Plant on time. The Sverdlovsk Uralkhimmash Plant disrupted the plan through its failure to deliver pyrites-roasting kilns to the Sumgait Superphosphate Plant. (Ekonomicheskaya Gazeta, 3 February 1961)

Plant Remodeling

At the end of 1959, the Ukrainian SSR Gosplan decided to terminate the production of agricultural machinery at a Pavlograd plant and to remodel it for the production of chemical equipment. /Comment: Presumably it is now known as the Pavlograd Khimmash Plant (T22 Nov 60)/.

Simultaneously, Gosplan ordered the Slavgorod Progress Plant, which produced spare parts for agricultural machines, to start making valves for the chemical industry. (Ekonomicheskaya Gazeta, 8 February 1961)

Kapron

The machinery builders of the Kiev "leninskaya kuznitsa" Plant have produced experimental models of equipment for producing kapron thread of fused caprolactam. The productivity of the unit is five tons of kapron thread every 24 hours. Also completed is the first unit for melting caprolactam, filtration of the melted product and transfer to polymerization equipment. A complex unit built of this equipment will cause all processes in the production of kapron, from the melting of the raw material to the polymerization -- to run continuously, thanks to which labor expenditures will be decreased significantly and the quality of kapron thread will be improved. This year series production of the new equipment will be introduced at the "leninskaya kuznitsa" Plant. (Pravda Ukrainy, 3 February 1961. Full translation)

Chemical Equipment

A worm machine for the production of polyethylene film with a width of 1,500 mm has been produced by the Bol'shevik Plant. One of the main advantages of the new machinery is the complete automation of the technological process. The same plant has produced an aggregate for manufacturing pressed materials (phenoplasts) using the continuous method with a productivity of 8000 tons per year. Automation, continuity of the technological process and high productivity make the new equipment stand out in comparison with existing equipment. The "Leninskaya kuznitsa" Plant has produced an ANP-5 continuous polymerization aggregate, designed for producing thread from fused caprolactam. This new equipment will make it possible to fully mechanize the process and raise the quality of production. (Ekonomicheskaya Gazeta, 4 February 1961. Full translation)

PUMPS AND COMPRESSORS

Petroleum Pumps

The Moscow Borets Plant is producing new-type pumps for the petroleum industry. Their drive wheels are made of plastic. Operational tests on an experimental series produced positive results. The length of operations between repairs was almost doubled. By the end of the year the plant will ship more than 100 of these pumps to the oil fields. (Ekonomicheskaya Gazeta, 2 November 1960. Partial translation)

Refrigeration Compressor

The AUU-400 ammoniac refrigeration compressor, produced by the Central Design Bureau of Refrigeration Machinery Construction jointly with the Kompressor Plant, is a machine of standardized series. This is the most productive of all domestic piston refrigeration compressors. The AUU-400 compressor is designed for operating in industrial refrigeration units with temperature range of evaporation from 0 to 25 degrees below zero Centigrade. The compressor is single-staged, eight-cylinder, block-cased, single-pass, with water-cooled cylinders. The AUU-400 has eight cylinders with a diameter of 150 mm and a piston stroke of 130 mm. Its refrigeration capacity is 417,000 large calories per hour with an evaporation temperature of -15 degrees and 960 rpm. Under these conditions the usable capacity of the compressor is 139 kw. The weight of the AUU-400 is almost half as much as the AV-300 compressor, it is shorter and much lower in height. Nevertheless, the power and heat indices are significantly higher. (Ekonomicheskaya Gazeta, 4 February 1961. Partial translation)

Heat Exchangers and Compressors

The Tuymazinskiy Plant -- the first of the gas-gasoline industry of the Bashkir Autonomous SSR -- has been in operation for several years. However, we are still forced to eliminate defects in equipment which was passed by the designers and machinery builders. Let us take the T-220 heat exchangers produced by the Tuapse Plant imeni 11th Anniversary of the October Revolution. They did not equip them with necessary heat exchange. In analyzing the reasons for this, it was brought out that there was extra clearance between the casing and the transverse partitions. It was necessary to "cover over" the casings: they were cut and the upper sections of the partitions were joined. But we have not yet eliminated all defects.

There are also many defects in the heat exchangers produced by the Lyudinovskiy Diesel Locomotive Plant. For example, the floating heads are set out of line with the casing tops, and the horizontal partitions are broken off from the tubing grills. The plant's normal-series petroleum pumps, produced at the Shchelkovskiy, Bobruyskiy Plants and other enterprises, have a common defect -- soft grease packing. The pump rotors are poorly balanced, the internal

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Heat Exchangers and Compressors (cont'd)

supports and drive mechanisms do not lie on an axis with the casings. As is well-known, the heart of a gas-gasoline plant is the comressor shop. These are equipped with 10GK compressors, which are produced by the Gor'kiy "Dvigatel' revolyutsii" Plant. The design and assembly of the compressors leave much to be desired. Gas motors go out of commission in short order. The cylinders and pistons wear out before they should, and they become scored and cracked. From the first day of operations of the Tuymazinskiy Gas-gasoline Plant, hundreds of thousands of rubles have been spent for repairs and alterations on new equipment, as well as on the elimination of design defects. (Ekonomicheskaya Gazeta, 12 February 1961. Full translation)

Pumps

The Priluki Construction Machinery Plant is advertizing 800 pumps of the RM-250 and TsD-35 types for sale. (Ekonomicheskaya Gazeta, 25 February 1961)

Compressor Equipment Standardization

Research in unification and standardization of compressor and refrigeration equipment design has recently been completed in the USSR. The Moscow Borets and Kompressor plants, in addition to 32 other plants in 17 sovnarkhozes, will be specialized in the production of this equipment.

The Kompressor Plant is series-producing condensors and evaporators for refrigerating units. The number of these finishing components has been reduced from 44 to 26 type-sizes. (Standartizatsiya, Moscow, February 1961, pages 13-14)

LOADING AND HOISTING MECHANISMS

Tower Crane Unification

The All-Union Scientific Research Institute of Construction and Road Machine Building has developed a plan for the unification of tower cranes of the KB series. There will be only eight types of unified cranes produced by eight plants. Until now tower cranes were produced by 48 plants. (Ekonomicheskaya Gazeta, 10 February 1961)

Tower Crane

The Sverdlovsk Machinery Plant of the Ministry of Construction of the RSFSR has made and tested a tower crane for the installation of the Moscow television tower -- the world's highest. The crane's boom and winch will be capable of lifting a 5-ton load to a height of 450 meters,. In the future it will be shipped to Moscow. (Izvestiya, 2 February 1961)

Foundation Cranes

The Moscow Karacharovskiy Machinery Plant has made its 150th tower crane. It produces 85 such cranes per year. In the near future, the plant will start the production of cranes of a new type, which will be used for the construction of foundations. The cranes will move around construction sites on tracks. In 1961 the plant will make 20 cranes for the construction projects of Moscow. (Vechernyaya Moskva, 24 February 1961)

CONSTRUCTION AND EARTH MOVING

New Excavator

Since the beginning of the Seven Year Plan the Sverdlovsk Uralmash Plant produced 600 excavators including two new types, which are 30% more productive than their predecessors. At present the plant is assembling an EKG-5 excavator with a bucket capacity of 5 cu m. It is lighter in weight and more efficient than previously produced models. (Ekonomicheskaya Gazeta, 23 February 1961)

Multi-purpose Road Machine

The Smolensk Plant imeni Kalinin has organized the series production of the KDM-1 multi-purpose road machine for cleaning streets and watering shrubbery in summer, and for snow-cleaning operations in winter. (Ekonomicheskaya Gazeta, 8 February 1961)

Stalino Excavator

According to K. Myshkin, chief mechanic of the Chasov-Yar Refractory Products Combine, the master model of an ERG-350/1000 excavator made by the Stalino Plant imeni 15-letiye Komsomola Ukrainy has a number of imperfections. (Ekonomicheskaya Gazeta, 10 February 1961)

New Scrapers

The Chelyabinsk Road Machinery Plant imeni Kolyushchenko has recently made new D-498 scrapers with a bucket capacity of 6-8 cu m. The plant will soon start series production of scrapers with a bucket capacity of 4.5 cu m. (Stalinabad, Kommunist Tadzhikistana, 8 February 1961)

Izhora Excavators

The EKG-8 excavators made by the Izhora Plant (near Leningrad) are of poor quality. Several of these machines recently broke down after only a few months in operation. (Leningradskaya Pravda, 10 February 1961)

Tashkent Excavator Production

According to plan, the Tashkent Excavator Plant is expected to produce 750 excavators annually. However, if all its production facilities were utilized efficiently, the plant could produce a considerably greater number of excavators.

Among the factors which prevent the expansion of production at the plant are: the lack of planning, obsolete equipment, poor utilization of manpower, and a high labor turnover. Thus, in 1960, over 500 workers left their jobs at the plant. The plant lacks a chief mechanic, a foundry foreman, and experienced workers. (Tashkent, Pravda Vostoka, 17 February 1961)

Kentau Excavators

In 1959 the Kentau Excavator Plant produced 30 excavators, in 1960 -- 112 units, and in 1961 will make 150 units. The plant has considerably improved the design of its E-303 excavator, and is currently assembling two E-403 excavators of a new modern type. (Kazakhstanskaya Pravda, 1 January 1961)

Giant Excavator

The designers of the mining equipment division of the Novo-Kramatorsk Machinery Plant have begun the technical design of the world's most powerful rotary excavator. Its hourly productivity of dense ores is 7,200 cu m. In digging canals and dams, the new giant excavator will remove up to 11,200 cu m of earth per hour. It will be able to handle stripping operations for the mining of minerals lying at a depth of 50 m and more. The dumping boom of the excavator extends 220 meters. The new machine, called provisionally the ERShR-2600 has 12 2.6 cu m capacity buckets on a 16-meter diameter rotary wheel. Along with the excavator, main-line conveyors, a 116-meter dump bridge and a dump-former are being designed. The total weight of the machine is 4,800 tons. It will be the first of similar units with self-propulsion on rails instead of caterpillar drive. The use of this new machine will allow a weight decrease of about 10% and will increase its maneuverability as well as operational life. This will save much metal. The first continuous action giant excavator will probably operate in Krasnoyarsk Kray, at the country's largest surface coal-mining operation. (Ekonomicheskaya Gazeta, 24 February 1961. Partial translation)

Canal Dredger

The Gidroproyekt Institute imeni S. Ya. Zhuk new construction machinery department is working on the design of a giant dredge. In one hour it will be able to handle up to 3,000 cu m of earth. This is a suction dredge with a suspension discharge pipe with a length of 110 m. The potential of this giant is great. It will be able to lay the bed of an extensive canal with a bank width of up to 300 m and a depth of up to 18 m. While in operation the unit will silt the bank dikes.

The new giant dredge is distinguished from existing equipment not only by high productivity but by the degree of automatic operations. It will have its own 6,000 hp power unit, which will make it independent from the "shore". Thanks to the powerful there is no necessity for shore tubing communication. With the aid of the pile-driving mechanism the unit, in removing earth, can move in any direction independently. The new dredger also has an unusual working displacement system. A unique earth-collecter mechanism is used, suspended from the revolving nose

Canal Dredger (cont'd)

tower. In present equipment, fan-like movements in underwater earth working are effected by the dredger body turning together with the earth collector mechanism suspended from it. Here only the nose tower turns. This feature and the unusual design of the pile-driver mechanism cut out unproductive work stoppages which are inevitable in the operations of ordinary dredgers. The operation of the giant dredger is made automatic to a maximum possible degree. The self-sufficiency of the construction giant makes it possible to use it in uninhabited areas, far from sources of electricity and other industrial installations. (Ekonomicheskaya Gazeta, 12 February 1961. Partial translation)

MISCELLANEOUS

Welded Structures Shop

The Sverdlovsk Uralmash Plant is constructing a new welded structures shop. It is planned to complete this shop 14 months ahead of schedule. (Komsomol'skaya Pravda, 19 February 1961)

Press Plant Production

In many cases the registration of agreements between producing plants and consumers takes 3-4 months, and as a result certain consumers refuse to accept and to pay for the items ordered. In 1959 the Dnepropetrovsk Press Plant was to deliver to consumers 24 pumps of the G-301 type. However, only 6 pumps were sent to them, because the consumers refused to accept the rest. In 1960 the plant was scheduled to deliver 13 P-790 presses, but seven of them have already been rejected by the consumers. (Moscow, Voprosy Ekonomiki, October 1960, page 67)

Triangular Calender

The Kiev Bol'shevik Plant is currently assembling the first experimental model of a triangular calender for finishing cord and cotton fabrics on one side, and also for doubling rubber sheet and rubberized fabric. It will be highly productive and will have automatic controls for regulating the thickness of the cord. (Ekonomicheskaya Gazeta, 7 February 1961)

Drilling Equipment

The Sverdlovsk Uralmash Plant is currently endeavoring to replace M-601 diesels in the 11-DE drilling rig with an NK-4 gas turbine and is planning a new GTU-125 drilling installation equipped with the same type of turbine. However, the development of drilling installations in the USSR is being done without any planning. Thus, the Uralmash Plant produces 200-ton 3D and 4E installations and is preparing to produce 13D and 14E units,. Other USSR enterprises make BU-200 and BU-200E drilling installations which hardly differ from those that are produced by the Uralmash Plant. (Ekonomicheskaya Gazeta, 19 February 1961)

False Production Reports

From year to year, the management of the Moscow Severyanin Plant fabricated phony reports about the fulfillment of gross production plans. Thus, in 1959, the actual gross production of the plant was 900,000 rubles less than reported by the management, which collected awards on the strength of inflated figures.

Several months ago, the plant was transfered under the Administration of Inter-branch Enterprises, but the situation has not changed bo a great degree, and the difference between the gross production figures and those of the actual output of the plant was liquidated only in the November 1960 report. (Ekonomicheskaya Gazeta, 4 February 1961)

Equipment Supply

The Izhora Plant of the Leningrad Sovnarkhoz last year produced only six EKG-8 excavators for iron ore mining enterprises instead of 11. The Toretskiy Plant and the Plant imeni 15th Anniversary of the LKSMU (Stalinskiy Sovnarkhoz) have not delivered 1000 cu m per hour capacity rotary excavators to the Lebedinskiy and Mikhaylovskiy mines of the Kursk Magnetic Anomaly. The Uralmash Plant is not meeting the deadline for delivering large crushers. For example, the KKD-1500 crusher for the Sokolovsko-Sarbayskiy mining combine was supposed to be produced in 1959, but 1960 has passed and it is not completed yet. As a result of the fact that the Kuybyshevskiy Sovnarkhoz has not aided the Syzranskiy Heavy Machinery Plant in developing heavy conveyor production, the production of a series of large enterprises for the mining industry was stopped last year. The Sibtyazhmash (Krasnoyarskiy Sovnarkhoz) has not delivered a foundry crane to the Azerbaydzhan Tube-rolling Mill and Ground-loading machinery for the Krivorozhskiy and Cherepovetskiy plants of the Orsko-Khalilovskiy combine. The Tashkent Pod"yemnik Plant has bogged down in Komsomol of the Ukrainian SSR.

Equipment Supply (cont'd)

the production of 16 cranes, and the Khar'kov Hoist-transport Equipment Plant -- 18 cranes.

The Moscow Kompressor Plant is not meeting the deadline for the delivery of ADK-73-40 refrigeration machinery. Many other enterprises of the capital are doing a far from satisfactory job in filling orders for particularly important construction projects. In particular, the Borets Plant failed to deliver 30 pumps last year. The Dinamo Plant -- direct current crane motors. Due to the fact that the directors of the Dinamo Plant did not ship two MP-72 electric motors in time, the operation of guiding aggregates was held up for a long time at the Transcaucasus Metallurgical Plant.

Non-ferrous metallurgy plants under construction need a large quantity of so-called non-standard equipment. The production of this equipment was given over to plants in the RSFSR and the Ukraine. The Kopeyskiy Plant, for example, was to produce continuous loading machinery, and the enterprises of the Sverdlovskiy Sovnarkhoz -- 20-25 ton self-propelled pneumatic cars for underground operations. The

Equipment Supply (cont'd)

directors of Uralmash, the Leningrad Plant imeni Kotlyakov, the Chelyabinsk Plant imeni Kolyushchenko, the Novosibirsk Trud Plant, the Kuybyshev Strommashina Plant and several others are particularly responsible for furnishing non-ferrous metallurgy with new model technological equipment.

Last year a significant growth took place in the capacity for the pumping and processing of petroleum, but this growth could have been greater if all machinery plants had fulfilled their obligations to the petroleum industry in full. The most important plants under construction in this field of industry were not delivered more than 15000 tons of equipment, about 500 pumps, 10000 control-measuring instruments. The Podol'sk Plant imeni Ordzhonikidze and the Stalingrad Plant imeni Petrov were particularly poor in filling orders. The RSFSR Gosplan Machine Construction Department, both last year and this year, is making mistakes in placing orders for oil refining enterprises. The production of pumps was handed to the Salavatskiy Plant while, according to affirmations by the Bashkirskiy Sovnarkhoz, it has not had and does not have the capacity for filling such an order.

Equipment Supply (cont'd)

Up to the present equipment of many type-sizes is produced for the cement industry. Identical machines produced by different plants differ considerably in weight, size, etc. Mill reduction gears with the "Volgotyazhmash" brand are almost 30% heavier than those of the Sibtyazhmash Plant, and the mills themselves which are produced by these enterprises differ in weight and dimensions. Talk has been going around for a long time on the unification and standardization of cement equipment and on cutting down type-sizes. It is time to make the transition from words to deeds! (Ekonomicheskaya Gazeta, 16 February 1961. Partial translation)

Production Difficulties

The Oktyabr'skiy Mechanical Plant is one of the basic suppliers in the Bashkir ASSR of equipment for the heavy chemical industry. Work here is going on under exceedingly difficult conditions. But it is not merely a matter of cramped quarters, for there is poor mechanization. In one boiler welding shop there is only one crane. When one brigade works, the others "have a smoke". Part of the equipment, for example, the guillotine shears and flexible rolls, are hopelessly obsolete. There can be no talk of rhythm, for there is no backlog formed. Tube grills, props and plugs come from the mechanical shop with great delay. This has a simple explanation. The men in the mechanical shop are attempting to fill first less labor-consuming orders -- for the oil fields and light industry, and the Bashkirskiy Sovnarkhoz has many such orders. And there is much defective production. In October, for example, several sets of tube grills were returned to the mechanical shop for additional work, and the nuts had to be specially forced on the bolts, although both were supposed to be of standard size. However, in the interests of justice we should say that the workers in the mechanical shop are not to blame for every-

Production Difficulties (cont'd)

thing -- there is a lack of equipment. It is hard to believe that in such an industrially developed republic as the Bashkir ASSR it is impossible to find for the plant even one boring and one radial -drilling machine. There are none. Both the City Party committee and the Sovnarkhoz are well aware of the fact that outmoded methods are being used at the Oktyabr'skiy Plant. But why has no aid been given? As early as June 1959 the Sovnarkhoz gave its construction administration and the Tuymazanneftestroy Trust the obligation to reconstruct the boiler welding shop by the beginning of last year. Funds were found, but in two years hardly one third of them have been used.

Construction men are being sent everywhere, but not to the enterprise which is producing chemical equipment. Even the roof of the new bays has not been completed, althought the deadline for the beginning of shop operations was passed a year ago. There are other difficulties which , although minor, are quite evident. Technical documentation is being drawn up carelessly. Much plan data and blueprints are missing in the order for the chemical plant

Production Difficulties (cont'd)

being constructed in Sterlitamak. Some of the plans must be drawn up once again in Oktyabr'sk. The Oktyabr'skiy Plant, as well as others of the chemical machinery industry of the Bashkir ASSR are suffering greatly from the uneven supply of materials and component parts. For example, the Salavatskiy Machinery Plant underfulfilled its production plan by tens of thousands of rubles (new rubles) due to this! Here is a report on the supply breakdown for plan fulfillment by this plant by months. In the chemical equipment shop in January of last year, the plan was fulfilled by 107 %, in February -- by 75, March -- 109, April -- 67, May and June -- 100, July -- only 13%, etc. Now and again the Oktyabr'skiy Plant has a shortage of tubing. This is explained quite simply: little tubing is needed, and the Ufa base of the Rosglavchernmetsnabsbyt does not want to "fool around" with this. There are also many difficulties in the production of elliptical bottoms. As early as the beginning of the year they wanted to install a press at the Salavatskiy Plant for this purpose, but the supplier plants let them down -- Yuzhuralmash, the Izhora Plant and Siblitmash.

Production Difficulties (cont'd)

There is insufficient flexibility and clarity in the operations of planning organs. This year two departments of the RSFSR Gosplan, one of which dealt in the production of chemical equipment, and the other -- in petroleum equipment, without consulting each other, arranged it so that the Salavatskiy Plant was given a doubled program. The plant directors sounded the alarm. Representatives of the Gosplan came to the plant, recognized their errors, and ... did nothing to change the situation. (Ekonomicheskaya Gazeta, 16 February, 1961. Partial translation)

ELECTRICAL POWER EQUIPMENT

Hydroturbine

The plans for the world's largest hydroturbine for the Krasnoyarsk Power Plant, drawn up by the designers of the Leningrad Metal Plant, were examined and approved by the Leningrad Sovnarkhoz technical-economic council with the participation of prominent specialists from Leningrad, Moscow, Khar'kov and other cities,. Theplanned turbine is of a radial-shaft type. With a water pressure of 93 meters it will develop a shaft capacity of 508,000 kw -- more than twice that of machinery now being produced for the Bratsk Hydroelectric Power Station. The size of the new unit is huge . The diameter of its drive wheel is 7.5 m, and the spiral chamber has an entrance aperture as large as a two-story house. 700 cu m of water per second flow through it to the turbine. The machine weighs about 1,300 tons. Solving the complex problems with the aid of the scientists of Leningrad, Moscow, Kiev and other cities, the designers drew up plans for a turbine having the highest efficiency coefficient, 94%. This machine will leave

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Hydroturbine (cont'd)

the achievements of foreign technology in this field far behind. It will be 4 times more powerful than the best produced in capitalist countries. (Kazakhstanskaya Pravda, 19 February 1961. Partial translation)

New Turbines

"At the Nuretskaya Hydroelectric Power Station," he said, "it is planned to install nine superpowerful radial-shaft turbines. Each one will have a capacity of 310,000 kw. This is almost three times as great as the capacity of each turbine at the Volga Hydroelectric Power Station imeni V. I. Lenin and the Stalingrad Hydroelectric Power Station. The Nuretskaya turbines will have 35% greater capacity than the Bratsk turbines. These planned turbines differ by possessing high "speed"; the drive wheels, with a diameter of 4.75 meters, will have a speed of 214.3 rpm. Thanks to this increase in speed, the weight and cost of the new turbines will be cut almost in half. The maximum efficiency coefficient will be greater than 93%, that is, it will be one of the highest in the world. The Khar'kov Turbine Plant will use welded and welded-cast structures broadly in the Kuretskaya turbines. Even such large parts as the shaft and drive wheel will be of welded construction. This will speed up production and will allow a cost decrease.

Much scientific research is being conducted parallel with the planning, for the creation of a flow section and new types of steel which are necesaary for producing drive

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wheels and guiding mechanism blades. The plant collective is carrying out its great and responsible task in the production of turbines for the Nuretskaya Power Station in creative collaboration with the workers of the All-union Hydromachinery Scientific Research Institute and the Central Scientific Research Institute oof Technology and Machine Construction. (Ekonomicheskaya Gazeta, 7 February 1961. Partial translation)

Gas Turbine Development

A small wooden outbuilding clings to one of the shops of the Yerevan Compressor Plant, just like a nest on a cliff. This little shack with the tarred felt roof contains the laboratory of the gas turbine equipment department of the Armenian branch of the All-union Scientific Research Institute of Electromechanics. In 1958 the Sovnarkhoz of the Armenian SSR decided to organize a gas turbine department. It was given the task f of creating a new, highly efficient engine for mobile electric power plants. The young collective bit into the task with great enthusiasm. In the fall of 1959 the technical plan for a free-piston generator for mobile electric power plants with a capacity of 200-300 kw was completed. It was soon approved by the Scientific-technical Council of the Scientific Reaearch Institute. This encouraged the collective, andby the middle of 1960 working blueprints for the new engine were completed. Each kw of the combined gas turbine electric power plant would cost only 16 rubles with this engine, that is, 7½ times cheaper than at diesel power stations. And this would be effected with a considerable decrease in weight. The most conservative estimates came to the

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Gas Turbine Development (cont'd)

conclusion that the use of each plant would save about 4000 rubles per year. The importance of the work being done by the young creative collective is understood everywhere. In order to supply the department with cadres, specialists in gas turbines were trained at the Mechanical-mathematics faculty of Yerevan University. The USSR Gosplan assigned a large sum of money for acquiring lab equipmemt.

At first the department received aid also from the Armenian SSR Sovnarkhoz. But later, as if frightened by their own boldness, the directors of the Sovnarkhoz stopped aiding its further development. The plan for a lab and experimental production shop, which was prepared two years ago, has been pigeonholed. The department still lacks a decent place for its lab, and it has neither a base for the production of test models nor a stand for testing them. Experimental models of a generator could have been assembled and tested as early as last fall. However, this project was not included in the republic plan for the incorporation and development of new technology. It is also not included in the plan for 1961. Why? The head of the Sovnarkhoz tech-

Gas Turbine Development (cont'd)

nical administration, A. Mirzoyan, says indifferently: "It is necessary to give an account for plan fulfillment. But this is something new... It is as yet unknown what will happen. And you see, there are no such combined gas turbine units abroad." (Ekonomicheskaya Gazeta, 26 February 1961. Partial translation)

Leningrad Turbines

The Leningrad Metal Plant is the country's first in the production of electric power machinery. It has gathered solid experience in the planning and production of steam turbines and has developed its own style of operations. We have built single-shaft, high-speed (300 rpm) superpowerful turbines. They are noted for their comparatively simple design and small number of cylinders, a high degree of standardization of components and parts. High parameter turbines have begun to predominate at electric power stations. Thanks to this the comparative expenditure of fuel for production of electricity has decreased considerably. The plant designers have worked out a new series of condensor steam turbines for rapid growth in theproductive capacity and increase in economical operation of heat and power stations. The "pioneer" of this series, with a capacity of 300,000 kw, has already been produced. It was possible to produce such a gigantic unit thanks to the creation of a last stage blade of unique size. Completely new design elements are used in the turbine. Welded and welded-cast structures are used extensively. The installation of four of

Leningrad Turbines (cont'd)

these turbines instead of six 200,000 turbines will allow a savings of 720 tons of metal on one aggregate alone. This will be suffieient for producing one 300,000 kw turbine. In addition, the machinery area can be decreased by 20,000 cu m. As a result, an electric power station will cost 5 million rubles less (new rubles).

Right now these creative efforts are continuing. In the design bureau sketches and technical plans for turbines have already been drawn up with a single-shaft capacity of 500,000 kw and a dual-shaft capacity of 800,000 and one million. But this naturally will require much work in design, research and experimentation. Many institutes and enterprises have lent us great help in the creation of new turbines. Types of heat-resistant steel are being developed by joint effort and many other research projects are being undertaken. We should note the work completed by Uralmash for producing large rotor forgings of steel alloy and the Nevskiy Plant imeni Lenin for incorporation of technology and production of forgings and castings for steam admission parts.

The plant is now producing extremely powerful radial-

Leningrad Turbines (cont'd)

shaft turbines for the Bratsk Power Station. They possess high power indices, as well as a high efficiency coefficient. They use low-alloy steels, which allows a significant decrease in machinery weight. Welding is used extensively for producing parts. For example, the drive wheel -- the heart of the turbine -- is welded-cast. The upper and lower rims are cast separately, as well as the blades. These castings were then joined into one part weighing about 100 tons by electroslag welding. The blades of the drive wheel, weighing two tons apiece, are cast in a shell-metal mold. Thanks to the high accuracy of casting, it is possible to eliminate the mechanical machining of the blades. While production was being arranged and the first turbines were being produced, the designers developed a new drive wheel, capable of increasing the capacity of the turbine by 20,000 kw, with the same size. This is the same as if the plant shipped 21 turbines to the power station instead of 20. The world's first "dual-feather" /dvukh-perovaya/ turbine is being produced by the Leningrad Plant. In operation rotary-blade turbines can be set for higher pressures and,

Leningrad Turbines (cont'd)

with this; the efficiency coefficient can be increased. Our plant is also producing various types of turbines for China, India, Poland and other countries. This year we shall produce an experimental turbine for the Stalingrad Power Station. It will weigh about 300 tons less than existing ones. This was done thanks to the application of several new engineering methods of calculation as well as the incorporation of new component parts. For example, the drive wheel was made on large roller bearings.

Large-scale laboratory research is being conducted in connection with the creation of large radial-shaft turbines for the Krasnoyarsk Power Station. They will be more than twice as powerful as the Bratsk Station turbines, 500,000 kw in one aggregate. It would be practically impossible to deliver the wheel of such a machine to the site. We succeeded in decreasing the diameter by one meter. This also makes it easier for the assembly men. At present the technical plans for turbines for the Krasnoyarsk Power Station are almost complete. By the end of the Seven Year Plan these unique aggregates will furnish electricity for Siberia,

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Leningrad Turbines (cont'd)

forcing the mighty waters of the Yenisey to serve the nation. Our collective is working on many other problems. It is well-known that the use of horizontal submerged aggregates decreases the cost of construction of low-pressure hydroelectric power stations by 20-30%. With higher water pressures ordinary rotary-blade turbines are no longer necessary, but diagonal ones. In order to increase the efficiency of electrical power equipment it would be expedient to construct accumulating hydroelectric power stations. They should be able, at the moment energy use declines, to store energy up by raising the water above the lower level in the accumulation basin. During the high use period -- they should produce the stored energy by using this basin. These stations should have reversible aggregates, which could work both under turbine and pump conditions. On the northern shores of our country the energy of the tides is ready to be harnessed. For this, horizontal aggregates will be necessary, which are capable of working under both turbine and pump conditions, as the waterflow reverses itself. The enterprise collective is now working on the creation of

Leningrad Turbines (cont'd)

such machinery. We will soon begin to produce some of these units. All of these tasks should be carried out by the plant before the end of the Seven Year Plan . (Ekonomicheskaya Gazeta, 9 February 1961. Partial translation)

Khar'kov Turbines

The Khar'kov Economic Rayon, as a center of electrical power machinery construction, is comparatively young. The Turbine Plant imeni Kirov began to produce small, stationary turbines in 1953-54. Now the powerful machinery from this plant provides energy at such large power stations as the Irkutsk, Novosibirsk, Kakhovskaya, Kremenchug and others. At the end of last year the plant collective produced the country's second unique steam turbine with a capacity of 300,000 kw. The Elektrotyazhmash Plant until recently produced chiefly electrical equipment for diesel locomotives, while now it series produces turbogenerators of 200,00 kw capacity. The machinery from these enterprises is noted not only for its high capacity but its technical-economic indices, meeting the very highest requirements. The third year of the Seven Year Plan has begun, and the plant collectives have started on the solution of even bolder tasks. The assembly of a 300,000 kw turbine has not yet been completed in the Turbine Plant shops, and in the design bureau work has already begun on the planning of new, more powerful machinery with 500 and 800,000 kw capacities.

Khar'kov Turbines (cont'd)

The first models of these unique units will be produced before the end of the Seven Year Plan . The same turbine plant is producing the world's largest rotary-blade turbine for the Saratov Power Station. The diameter of the drive wheel of this turbine is 10.3 m, one meter larger than the diameter of the wheels of the largest hydroturbines installed in the Volga Power station. For the first time in Soviet hydroturbine construction, the plant has begun to design submerged horizontal hydrounits. The construction of a 300,000 kw turbogenerator is proceeding at full speed in the shops of the Elektrotyazhmash Plant, and by the convening of the XXIInd Party Congress the technical plans will be completed for a 500,000 kw machine. The creation of this single-shaft turbogenerator will mean that our country has passed the United States in the field of turbogenerator construction. In the design bureaus of Elektrotyazhmash, the plan for an even more powerful machine, 800,000 kw -- is being prepared.

The main tendency in electrical power machinery construction is the construction of large machinery. This is understandable. Furnishing power stations with mighty

Khar'kov Turbines (cont'd)

turbogenerators will cut down the volume of construction work on the power stations themselves and will speed up the time when they can be put into operation, as well as decreasing the cost of electric energy. It is characteristic that our new 300,000 turbine will save 15 million rubles in fuel alone compared to 100,000 kw machines during the first years of operation! Our plants are living an extremely creative life. But we have our weak points, many unsolved problems which bother us, create artificial difficulties and sometimes lead us up blind alleys. Take the last few months of operations in the Turbine Plant. The thousands lived with one thought in their minds: to carry out their socialist obligation by the end of the year, bo produce the unique 300,000 turbine for the country before the deadline. Everyone wanted the new turbine to go into actual operation as rapidly as possible. And everyone worked for this dream to come true. The turbine was produced one year ahead of schedule. Has it been installed in any new power station? No. The Electric Power Station Construction Ministry "did not

Khar'kov Turbines (cont'd)

realize" the enthusiasm of the turbine builders: the structure to house this tremendous unit has not yet been completed, and it has been left at the plant "for safekeeping". This has not only insulted the turbine constructor collective but has caused a loss to the country's power economy. Even more so, the 300,000 turbine is the leading piece of equipment in turbine construction for all the years of the Seven Year Plan. Verification in operation is the document for ensuing turbines. But this document obviously will not be received very soon. Unfortunately, this is no isolated event. As early as 1958 the Turbine Plant produced the first 150,00 kw steam turbine. Since then a whole series of such turbines has been produced, but these turbines only last year began to be developed and adjusted under normal steam parameters. Under such conditions the plant cannot take timely measures for adjusting the machinery and is forced to introduce separate design changes for the whole series, and not for the master model. The same situation holds true for the 200,000 kw Elektrotyazhmash turbogenerators. Why is this happening? It is well-known that in the past years the construction of heat

Khar'kov Turbines (cont'd)

and electric power stations in the country has developed rapidly, and yet new turbounits have been compelled to sit around in warehouses for months awaiting boilers. Other auxiliary equipment is also produced very slowly for the testing of master models. The Electric Power Station Construction Ministry does not always succeed in carrying out construction work by the established deadline.

Electrical power equipment builders are dependent on plants supplying enterprises with special initial material and component parts, epoxy resins for winding turbine generator stators. The Elektroizolit Plant of the Moscow Oblast Sovnarkhoz is not supplying special rotor textolite in the necessary quantity and by the established deadlines. We have particularly serious complaints against the steel industry. Electrotechnical steel which is being furnished to us is suffering high comparative losses. The country is being deprived of hundreds of millions of kw/h of energy. We are on the path of creating new large machines. Their production requires special machine tools and aggregates for the mechanization of the winding-insulation work. But

Khar'kov Turbines (cont'd)

the machine tool industry is also not filling our need. The collective of the Khar'kov Turbine Plant has outlined measures which should be taken to increase capacity sharply by expanding shops. With minor capital investment, on the same production base, within the Seven Year Plan it would be possible to increase production of steam and gas turbines by about four times, and hydroturbines -- two times. This is a program which can be effected. But these measures have not been examined thoroughly by the USSR Gosplan and the USSR Council of Ministers State Economic Committee.

These days it is impossible to create a new, highly efficient machine without large-scale experimental and scientific research work. It is understandable that it is necessary to have a reliable laboratory base for this, and it is necessary to expand and improve continuously the design and technological bureau as well as experimental shops. Finally, it is necessary for large enterprises to have scientific research and design organs which would work on the problems of the future and would not depend on the

Khar'kov Turbines (cont'd)

bank balance of the enterprise. Even scientific research institutes attached to the Mechanical Plant and the Elektrotyazhmash Plant, due to a lack of funds for construction, do not have their own experimental bases. (Izvestiya, 11 February 1961. Partial translation)

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